



Engineer Research and  
Development Center

# Overview of GenCade in SMS 11.1

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GenCade Webinar

16-18 October 2012



**US Army Corps  
of Engineers®**



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# Overview of Presentation

- Introduction to GenCade in the SMS
  - Conceptual model
    - Set up shorelines, waves, and structures in real-world coordinates
  - GenCade model
    - All features are referenced to grid cell numbers
    - GenCade input files are created
    - Set up model control
    - Run GenCade
    - View results

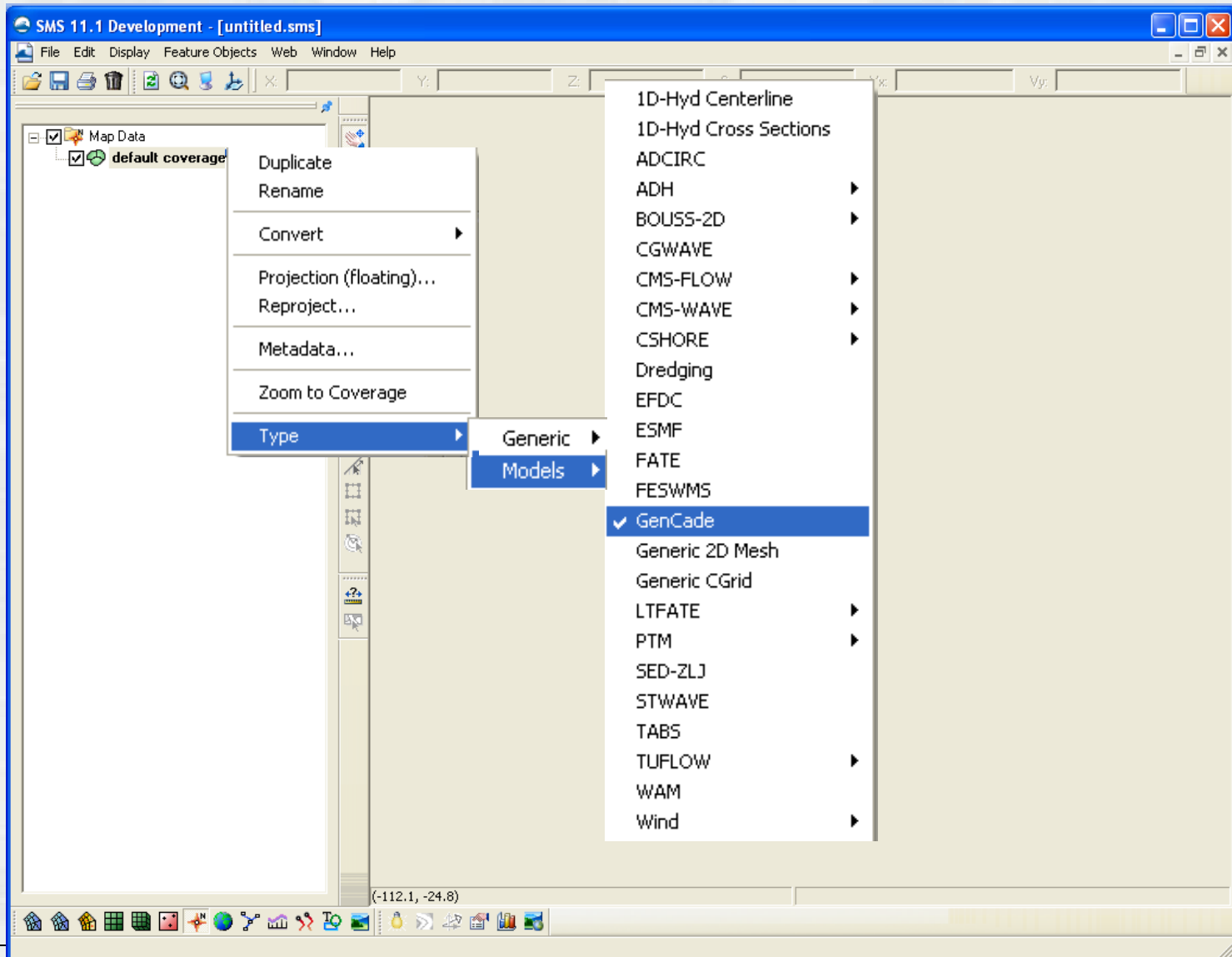


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# Define as GenCade

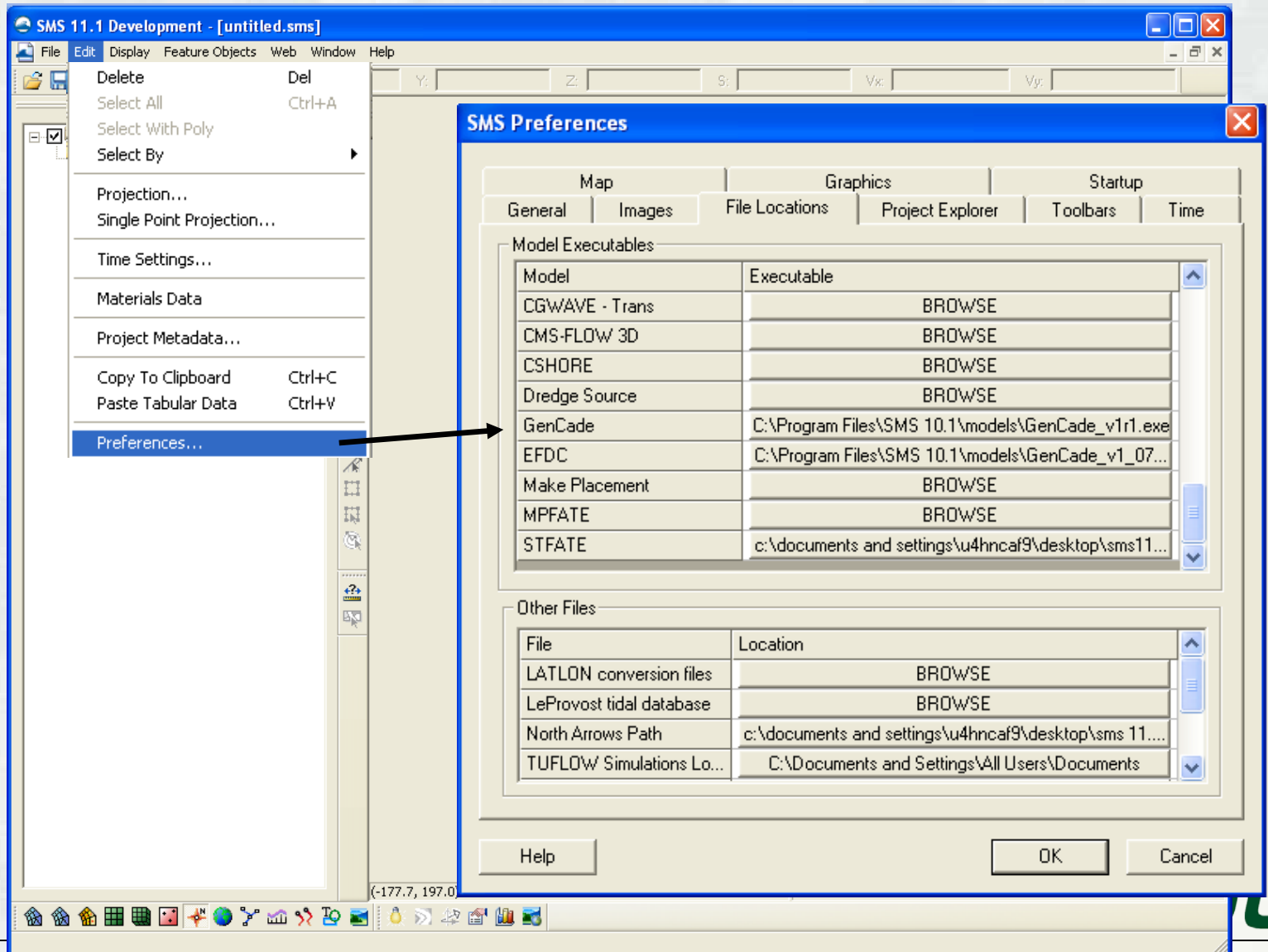


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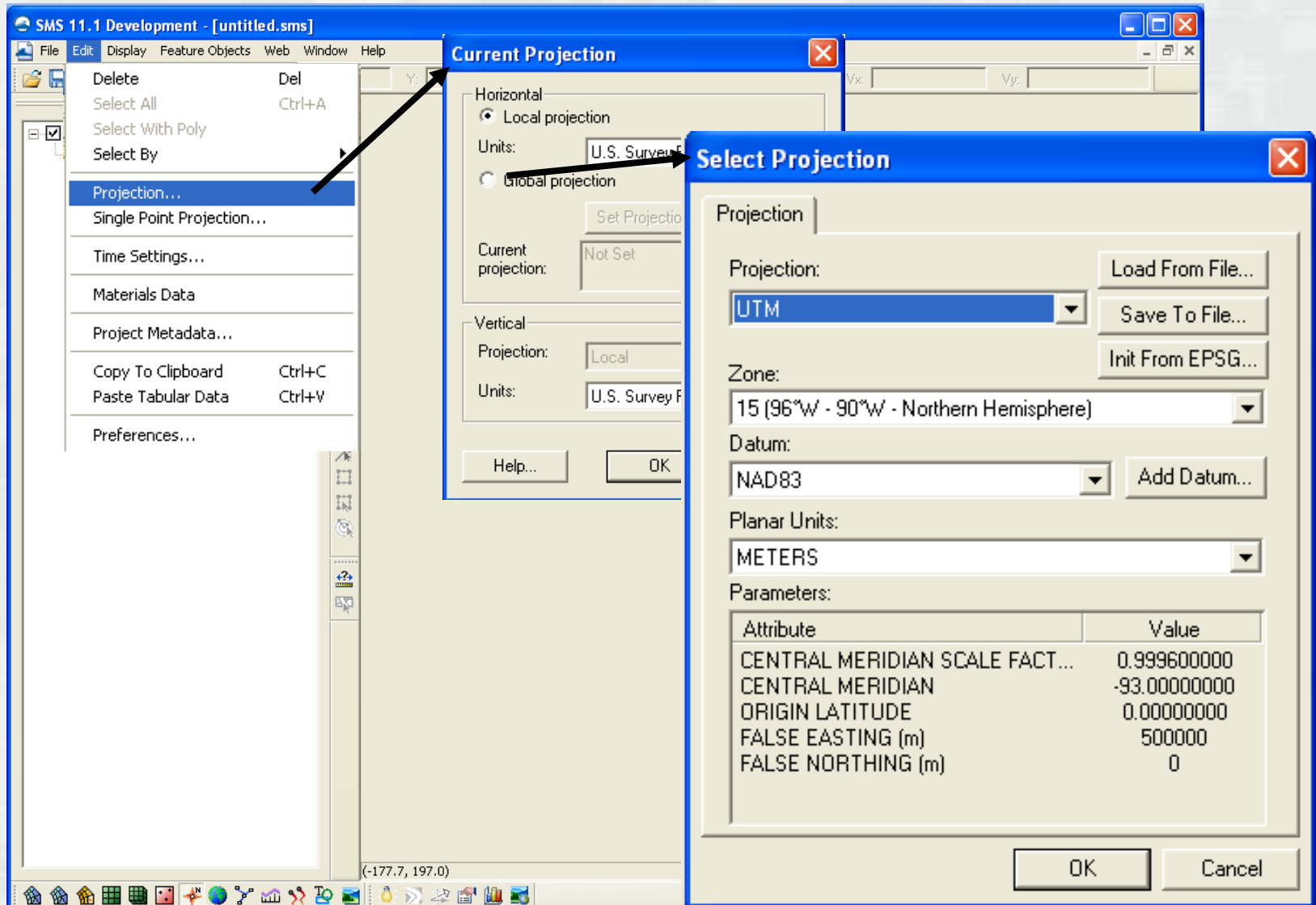
# Location of Executable



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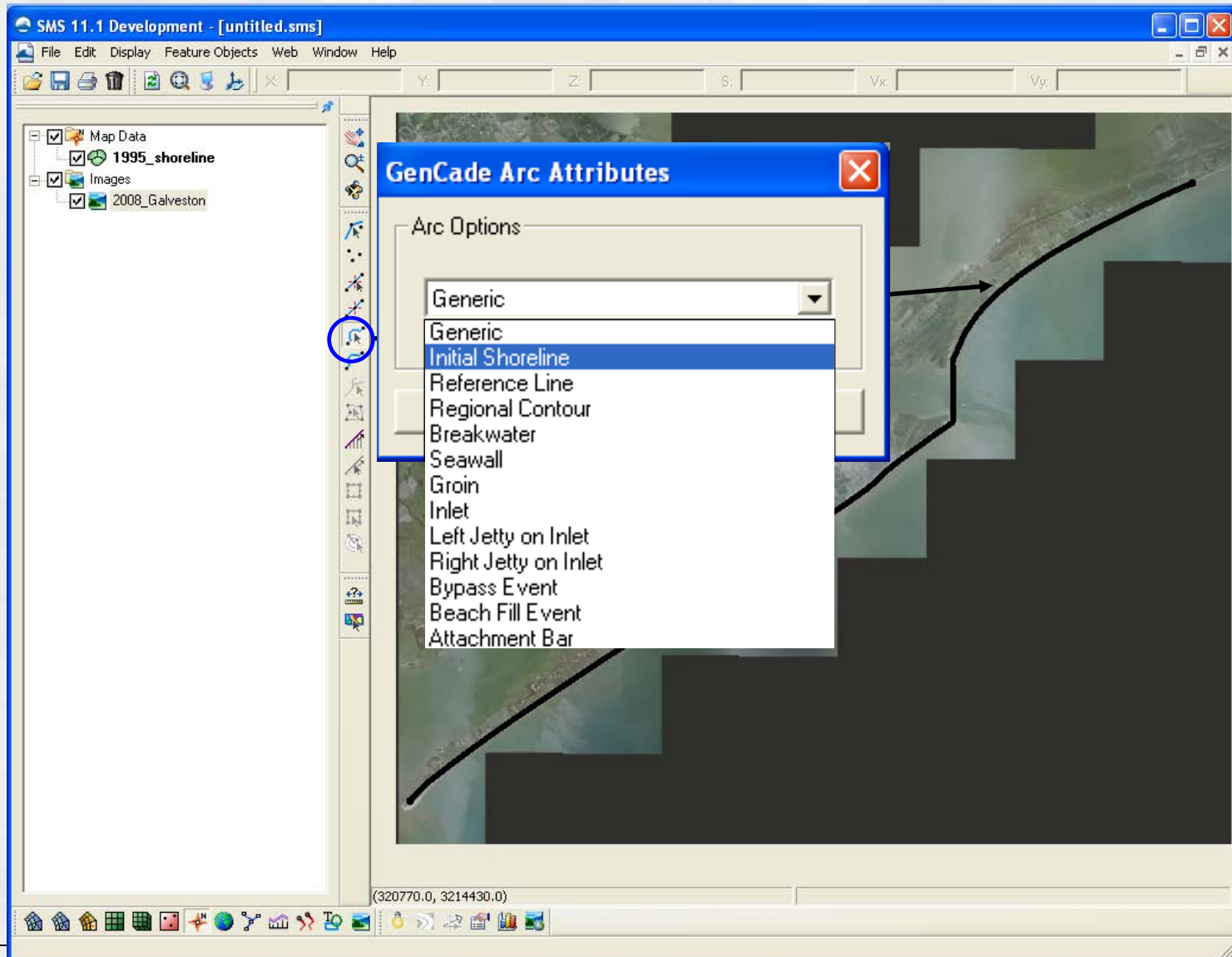
# Define Projection



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# Define Initial Shoreline

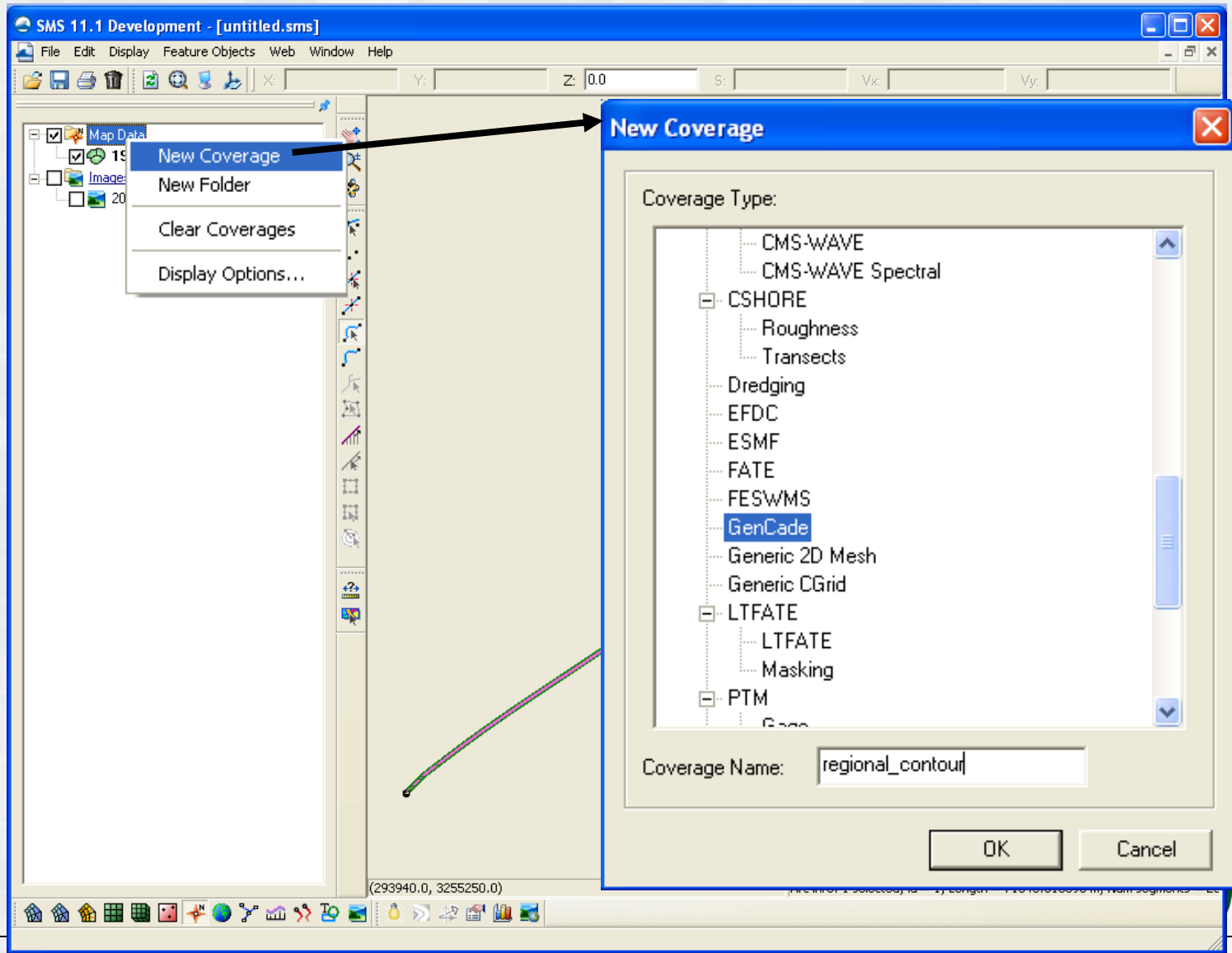


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# Add New Coverage



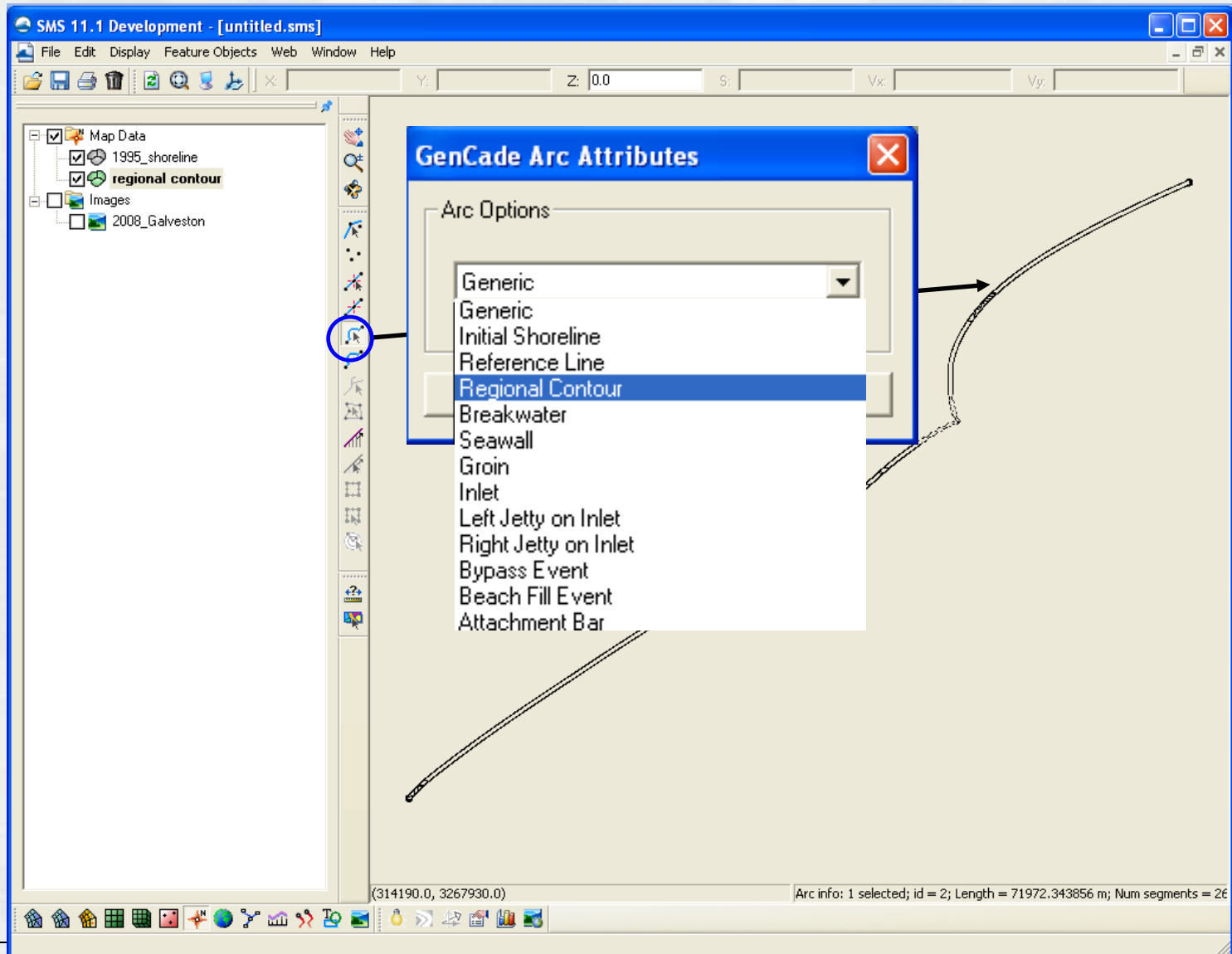
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# Define Regional Contour

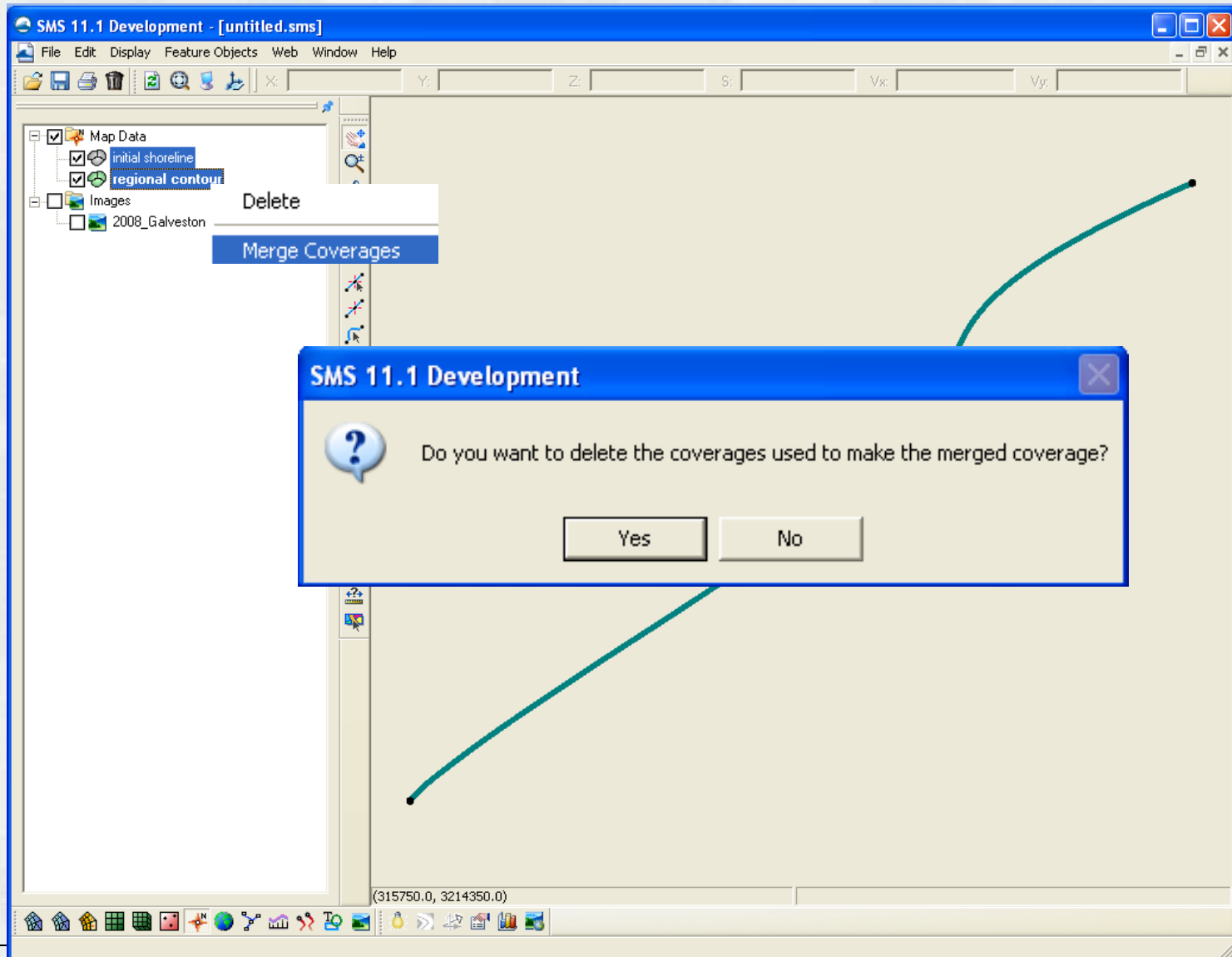


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# Merge Coverages

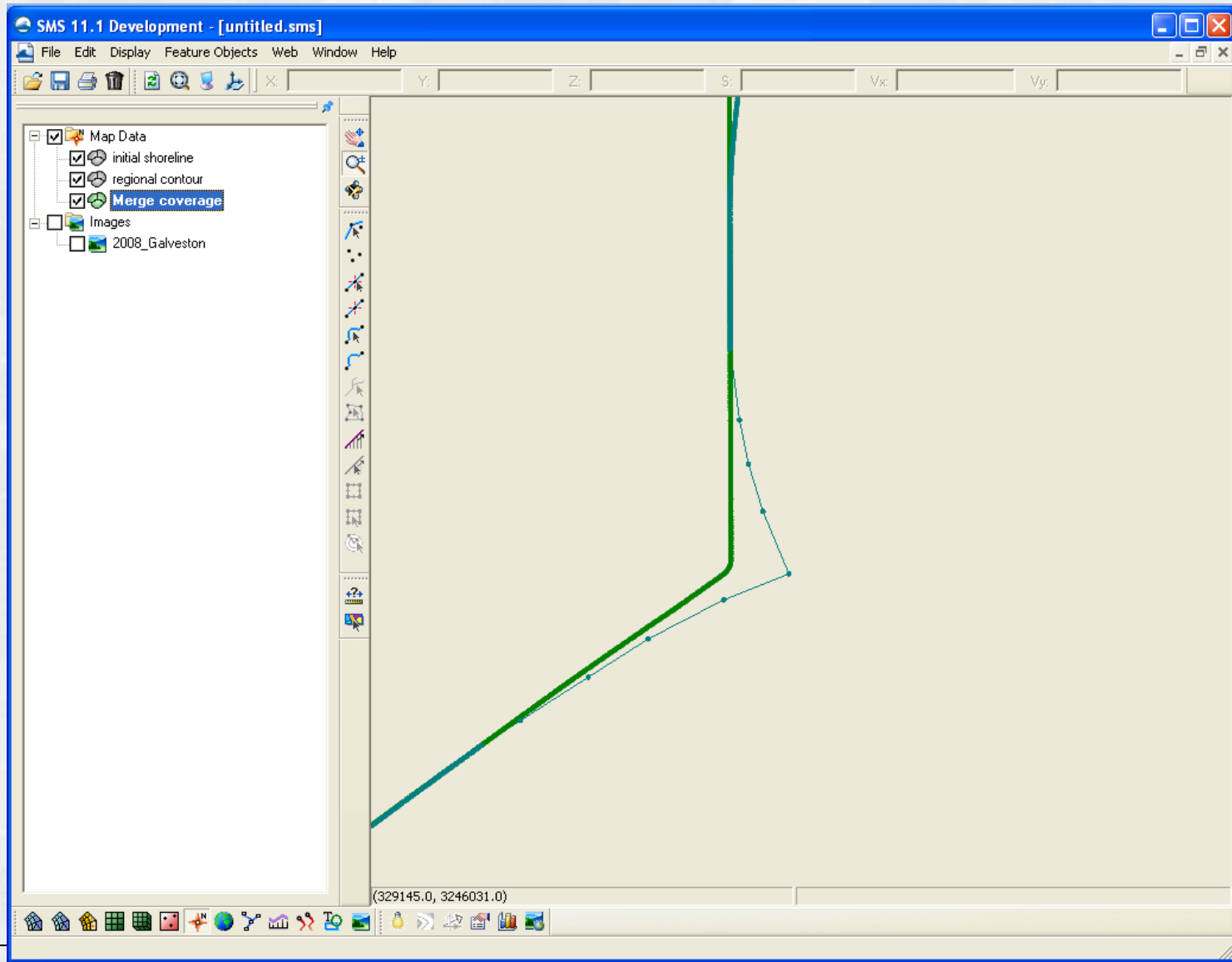


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# Merged Coverages

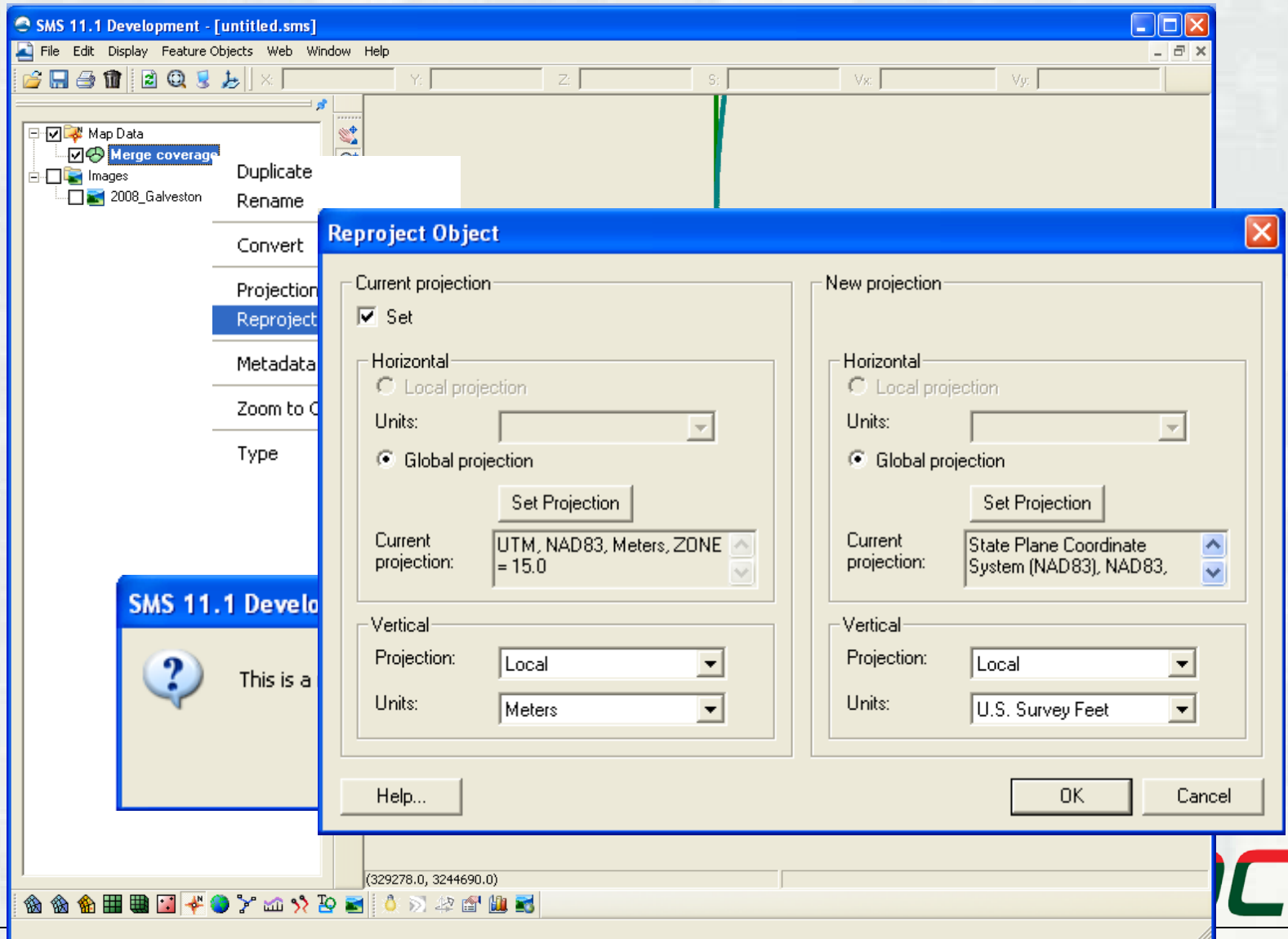


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# Convert to New Projection



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# Convert to New Projection

**SMS 11.1 Development - [untitled.sms]**

**Current Projection**

Horizontal

☐ Local projection

Units: [ ]

☒ Global projection

Set Projection

Current projection: UTM, NAD83, Meters, ZONE = 15.0

Vertical

Projection: Local

Units: Meters

Help... OK Cancel

**Select Projection**

Projection

Projection: [State Plane Coordinate System] Load From File... Save To File... Init From EPSG...

Zone: Texas South Central (FIPS 4204)

Datum: NAD83 Add Datum...

Planar Units: FEET (U.S. SURVEY)

Parameters:

Attribute	Value
STATE PLANE SCALE FACTOR	1
EXTRA FALSE EASTING (m)	0
EXTRA FALSE NORTHING (m)	0
EXTRA SCALE CENTER EASTING...	0
EXTRA SCALE CENTER NORTHING...	0
FIRST STANDARD PARALLEL	28.38333333
SECOND STANDARD PARALLEL	30.28333333

OK Cancel

(328122.0, 3247391.0)

Check or switch the current coordinates.



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# Inlets

**GenCode Arc Attributes**

Arc Options

Inlet

Attributes...

Help... OK Cancel

**Inlet Shoal Volumes**

	Initial	Equilibrium
Ebb	5000000.0	5000000.0
Flood	1000000.0	1000000.0
Left Bypass	1000000.0	1000000.0
Left Attachment	500000.0	500000.0
Right Bypass	1000000.0	1000000.0
Right Attachment	500000.0	500000.0

Help... OK Cancel

**Inlets (Reservoir Model and Jetties)**

	Name of Inlet	Cell	(yd³)	Control	Manage	Left Bypass Coef	Right Bypass Coef
1	Galveston	Position...	Volume...	Jetties...	Dredging...	1.0	1.0

**Dredging Events**

	Begin Date	End Date	Shoal to Be Mined	Volume (yd³)
1	01-Jan-1996	01-Mar-1996	Ebb	1000000.0
2	25-Sep-2012	25-Sep-2012		

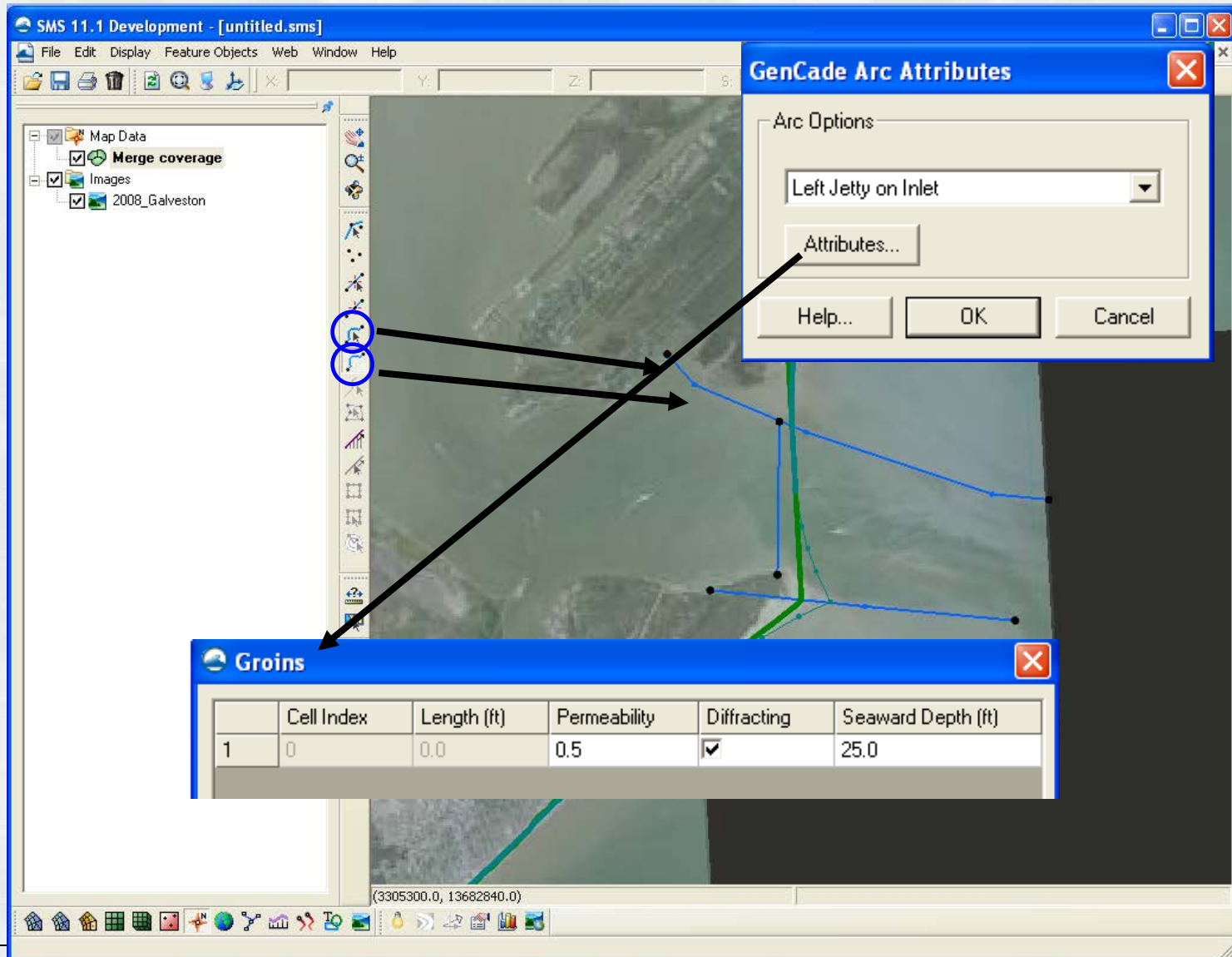


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# Jetties



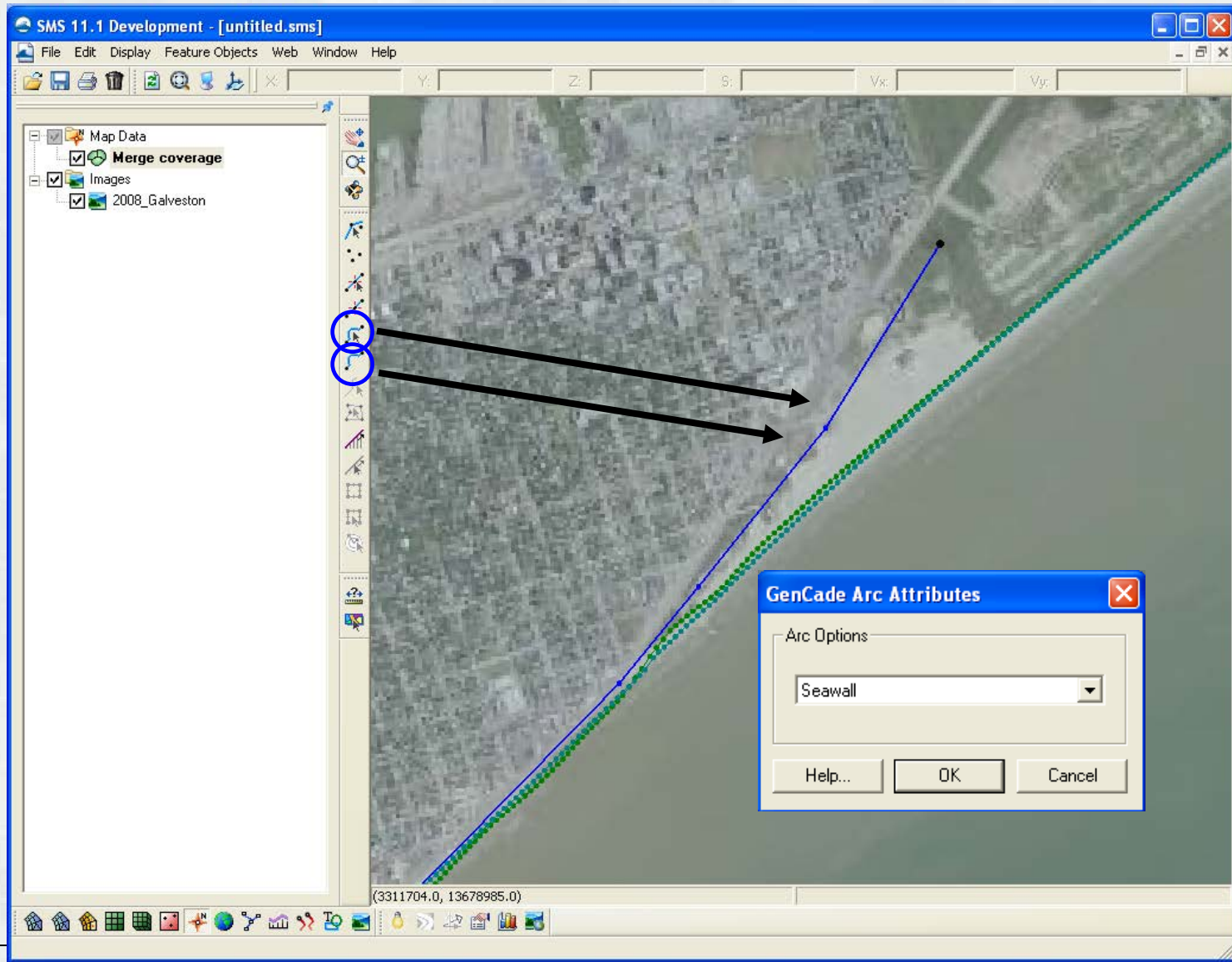
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# Seawall



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# Groins

The screenshot displays the SMS 11.1 Development software interface. The main window shows a map of a coastal area with a blue line representing a groin structure. Two dialog boxes are open:

- GenCode Arc Attributes**: This dialog box is titled "GenCode Arc Attributes" and contains a section labeled "Arc Options". A dropdown menu is set to "Groin", and there is an "Attributes..." button. At the bottom are "Help...", "OK", and "Cancel" buttons.
- Groins**: This dialog box is titled "Groins" and contains a table with the following data:

	Cell Index	Length (ft)	Permeability	Diffracting	Seaward Depth (ft)
1	0	0.0	0.1	<input checked="" type="checkbox"/>	8.0

Arrows indicate the workflow: one arrow points from the "Attributes..." button in the "GenCode Arc Attributes" dialog to the "Groins" dialog, and another arrow points from the "OK" button in the "GenCode Arc Attributes" dialog to the "Groins" dialog. A third arrow points from the "Groins" dialog to the map area.



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# Beach Fill

SMS 11.1 Development - [untitled.sms]

Map Data  
Merge coverage  
Images  
2008\_Galveston

GenCode Arc Attributes

Arc Options  
Beach Fill Event  
Attributes...  
Help... OK Cancel

Beach Fill

	Begin Date	End Date	Start Cell	End Cell	Added Berm Width (ft)
1	01-Jan-1995	01-Mar-1995	0	0	30.0
2	25-Sep-2012	25-Sep-2012	0	0	

(3290721.0, 13663961.0)



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# Detached Breakwater

The screenshot shows the SMS 11.1 Development software interface. The main window displays a map with a breakwater structure. Two dialog boxes are open: 'GenCode Arc Attributes' and 'Detached Breakwaters'.

**GenCode Arc Attributes Dialog:**

- Arc Options:** Breakwater (selected in the dropdown)
- Buttons:** Attributes..., Help..., OK, Cancel

**Detached Breakwaters Dialog:**

	Start Cell	Y1 (ft)	Depth 1 (ft)	End Cell	Y2 (ft)	Depth 2 (ft)	Transmission	Coeff/Perm/Atts
1	0	0.0	5.0	0	0.0	5.0	Ahren's	0.0

The 'Transmission' dropdown menu is open, showing the following options:

- Constant
- Ahren's
- Seabrook & Hall
- d'Angremond

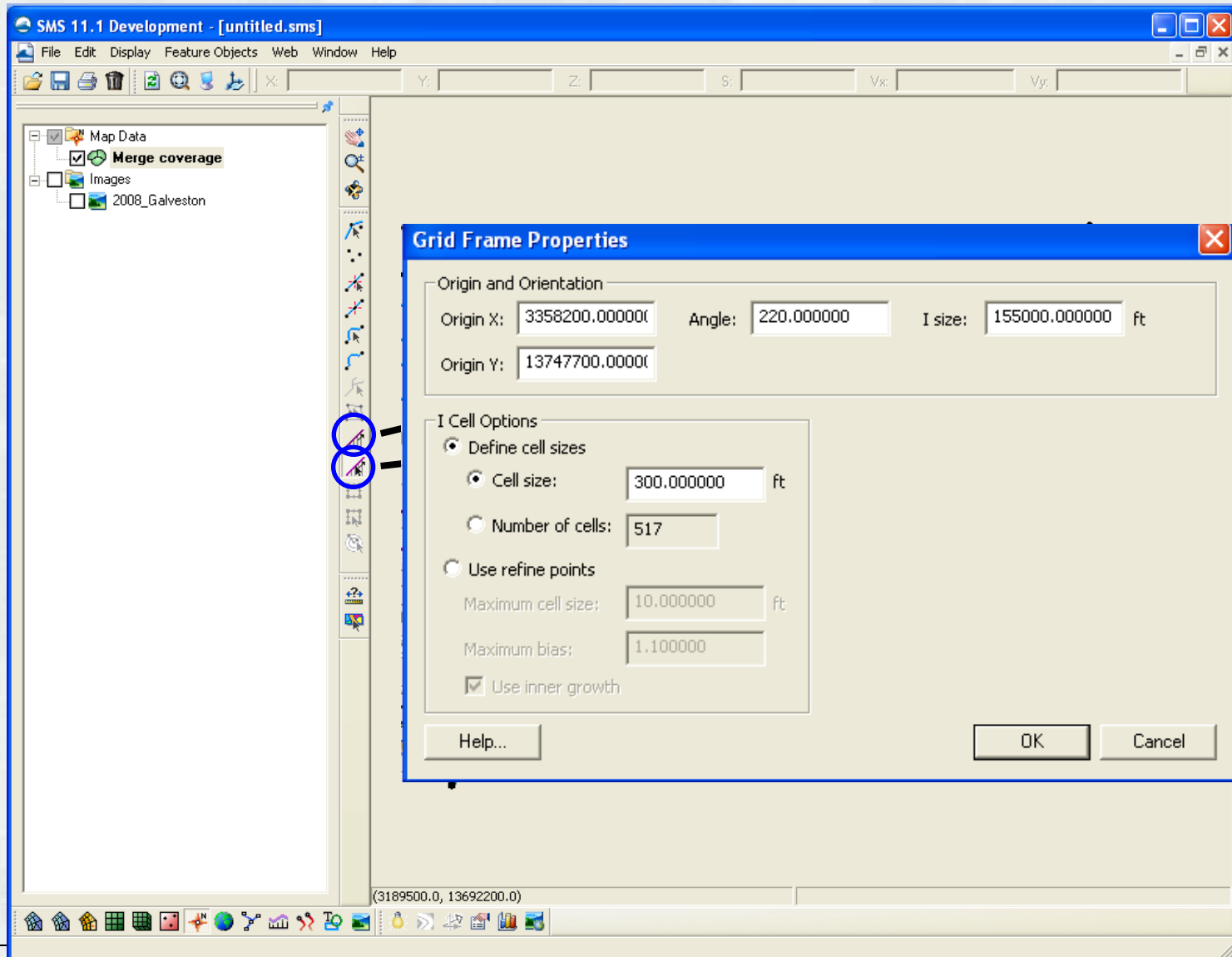


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# Grid Setup



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# Wave Gauges

The screenshot displays the SMS 11.1 Development interface with three dialog boxes open:

- Refine Point**: Shows attributes for a point. The 'Wave gage' checkbox is checked. An arrow points from this checkbox to the 'Wave Gages' dialog.
- Wave Gages**: A table showing gage data. An arrow points from the 'Data...' button to the 'Wave Events' dialog.
- Wave Events**: A table showing wave event data. An arrow points from the 'Interpret Directions As' dropdown to a small map icon in the bottom right corner.

**Wave Gages Table:**

	Cell	Depth (ft)	
1	258	50.0	Data...

**Wave Events Table:**

	Date	H0 (m)	Period (sec)	Direction (deg)
1	01-Jan-1995 0:00	1.0	5.0	10.0
2	01-Jan-1995 1:00	1.0	5.0	10.0208
3	01-Jan-1995 2:00	1.0	5.0	10.0417
4	01-Jan-1995 3:00	1.0	5.0	10.0625
5	01-Jan-1995 4:00	1.0	5.0	10.0833
6	01-Jan-1995 5:00	1.0	5.0	10.1042
7	01-Jan-1995 6:00	1.0	5.0	10.125
8	01-Jan-1995 7:00	1.0	5.0	10.1458
9	01-Jan-1995 8:00	1.0	5.0	10.1667
10	01-Jan-1995 9:00	1.0	5.0	10.1875
11	01-Jan-1995 10:00	1.0	5.0	10.2083
12	01-Jan-1995 11:00	1.0	5.0	10.2292
13	01-Jan-1995 12:00	1.0	5.0	10.25
14	01-Jan-1995 13:00	1.0	5.0	10.2708
15	01-Jan-1995 14:00	1.0	5.0	10.2916
16	01-Jan-1995 15:00	1.0	5.0	10.3125
17	01-Jan-1995 16:00	1.0	5.0	10.3333
18	01-Jan-1995 17:00	1.0	5.0	10.3541
19	01-Jan-1995 18:00	1.0	5.0	10.375
20	01-Jan-1995 19:00	1.0	5.0	10.3958

**Interpret Directions As:**

Convention: **Shore Normal** (selected)  
 Oceanographic  
 Meteorologic  
 Cartesian

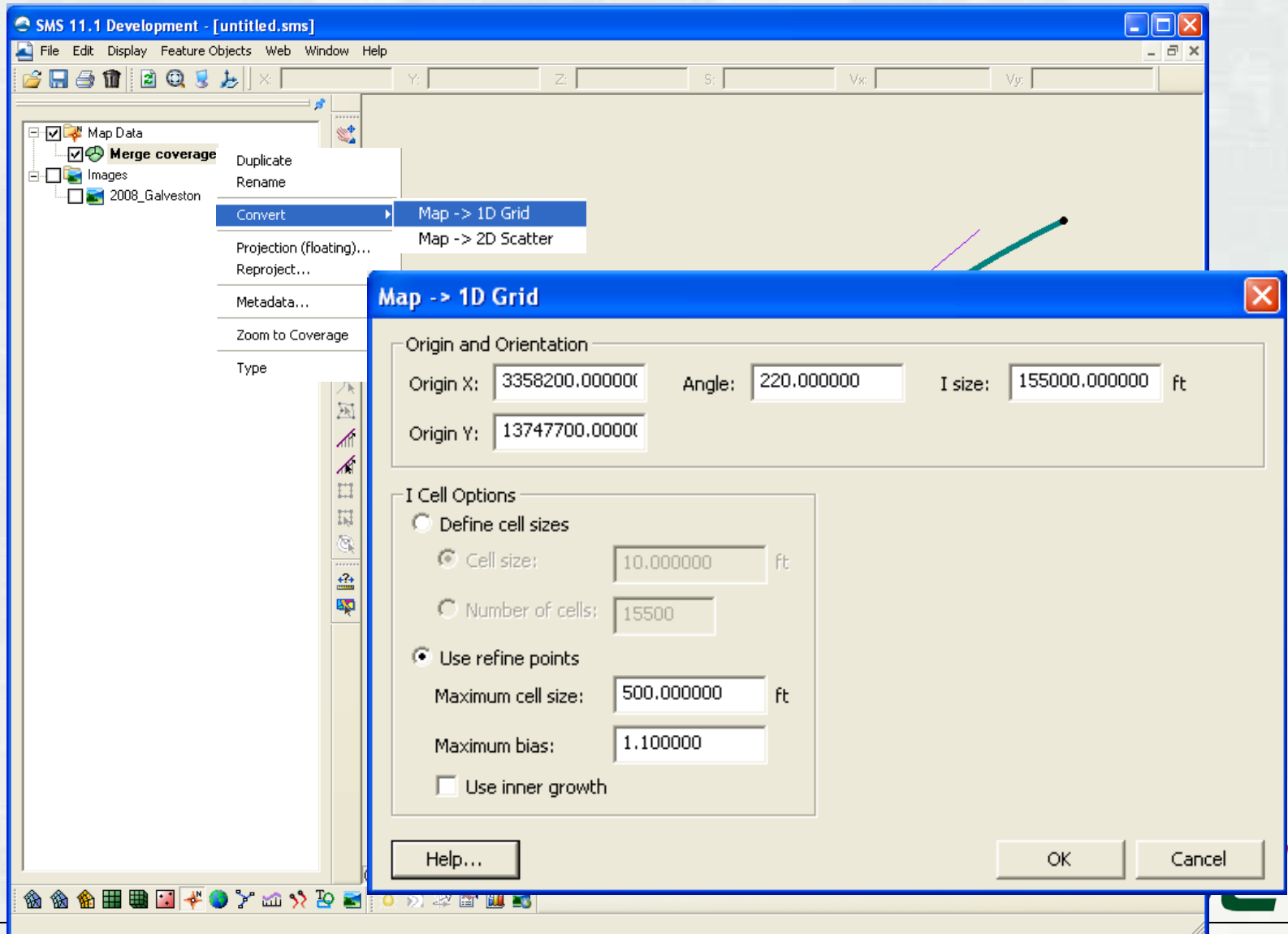


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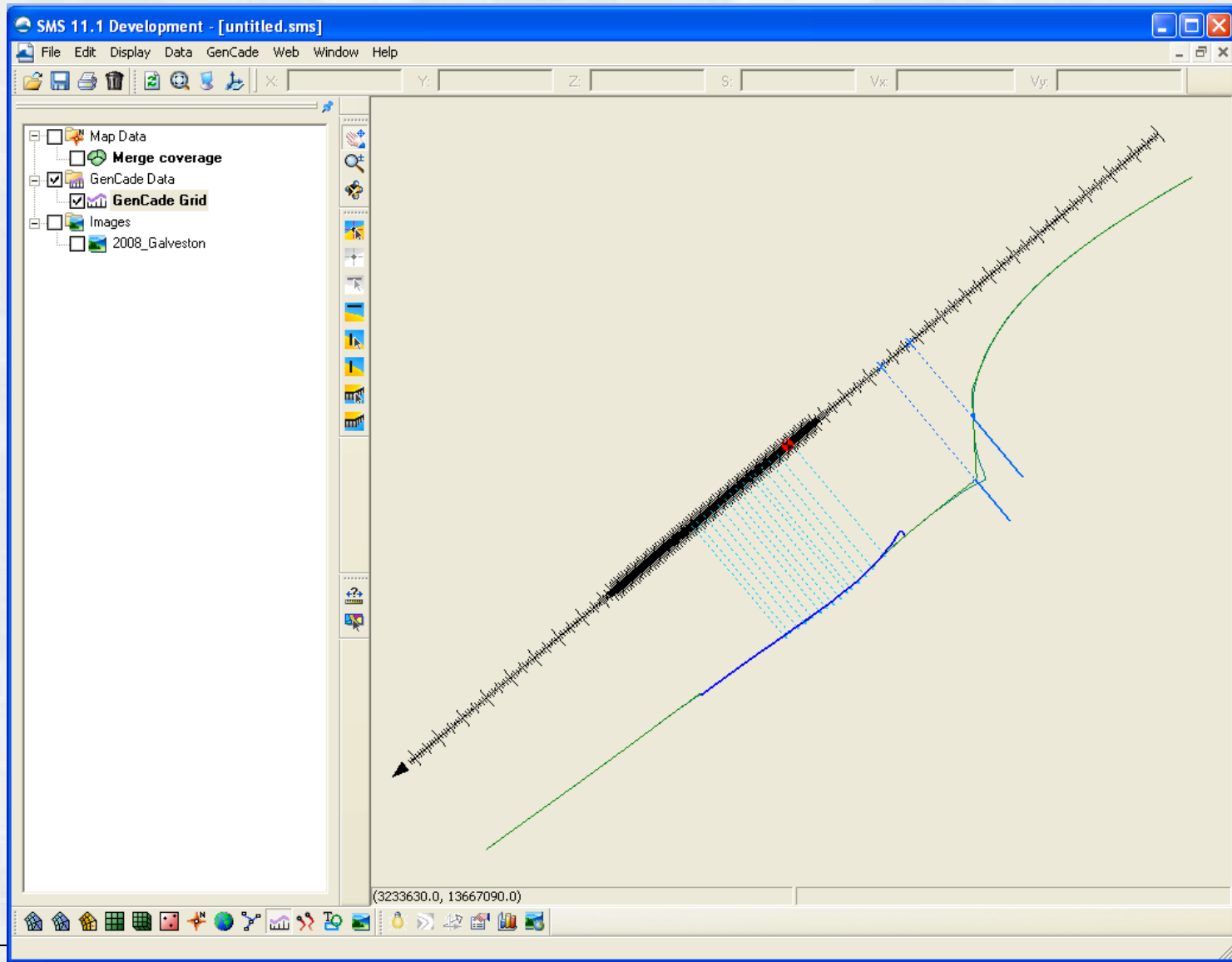
# Convert to 1D Grid



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# GenCade Model



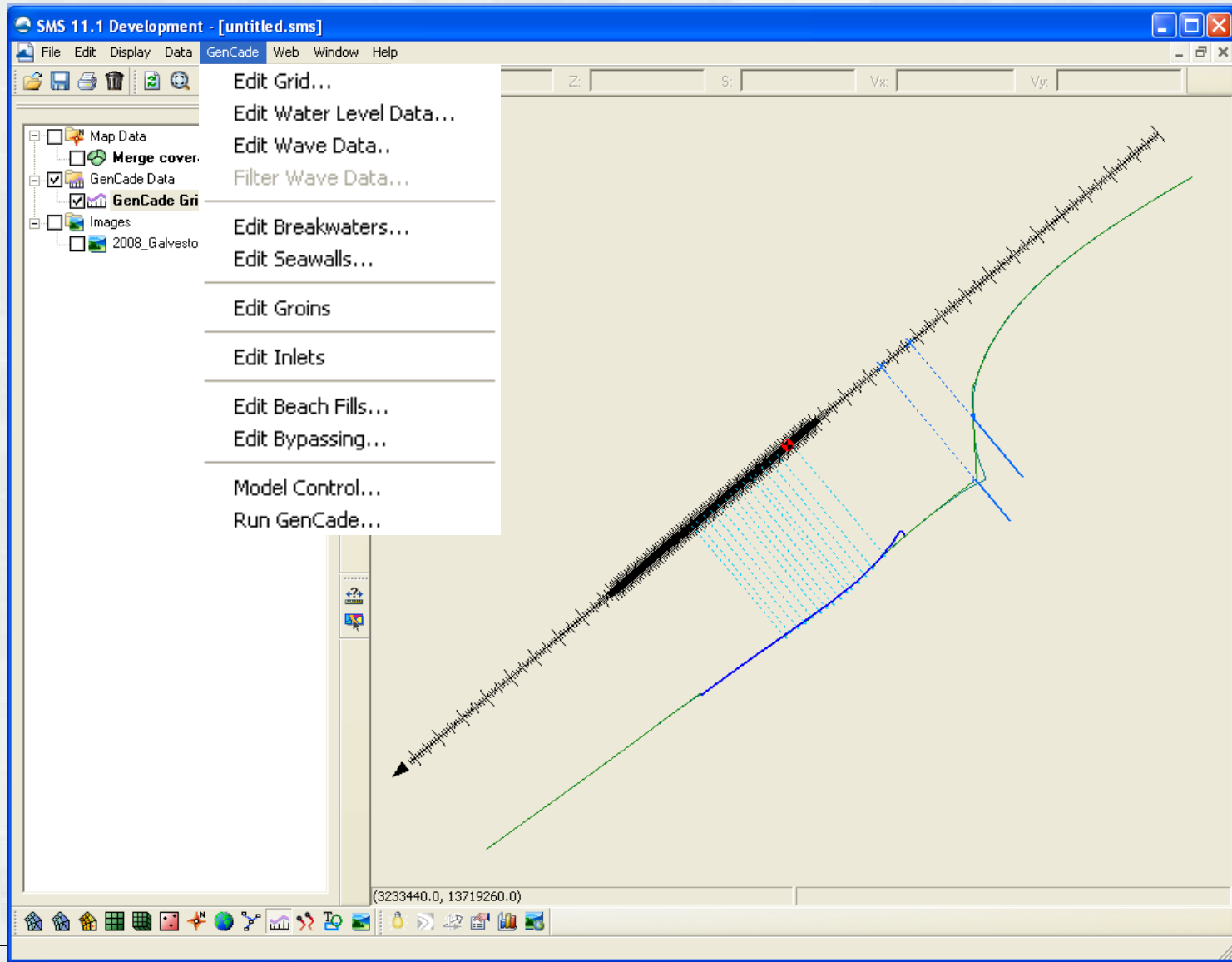
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# GenCade Model



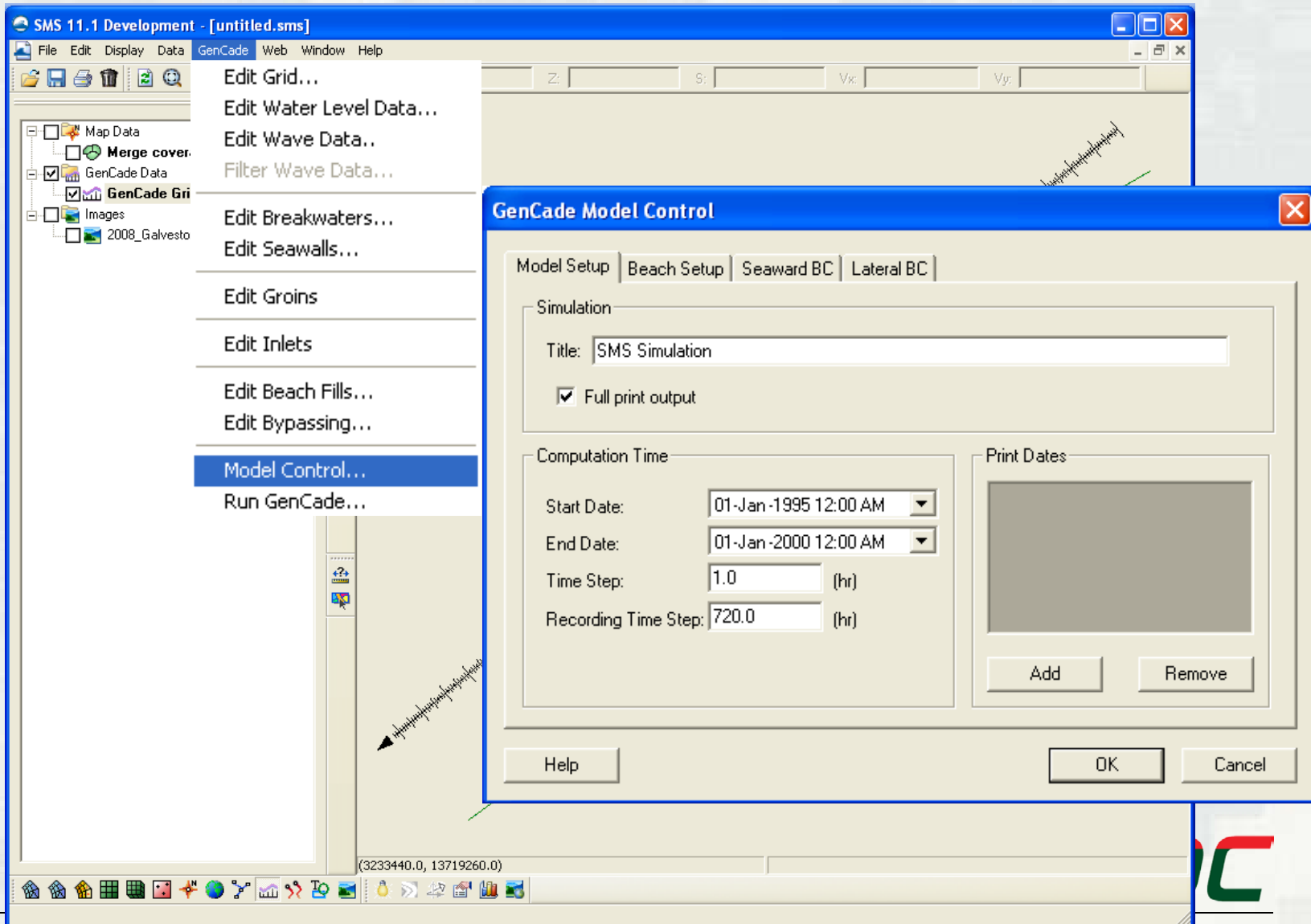
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# GenCade Model Control

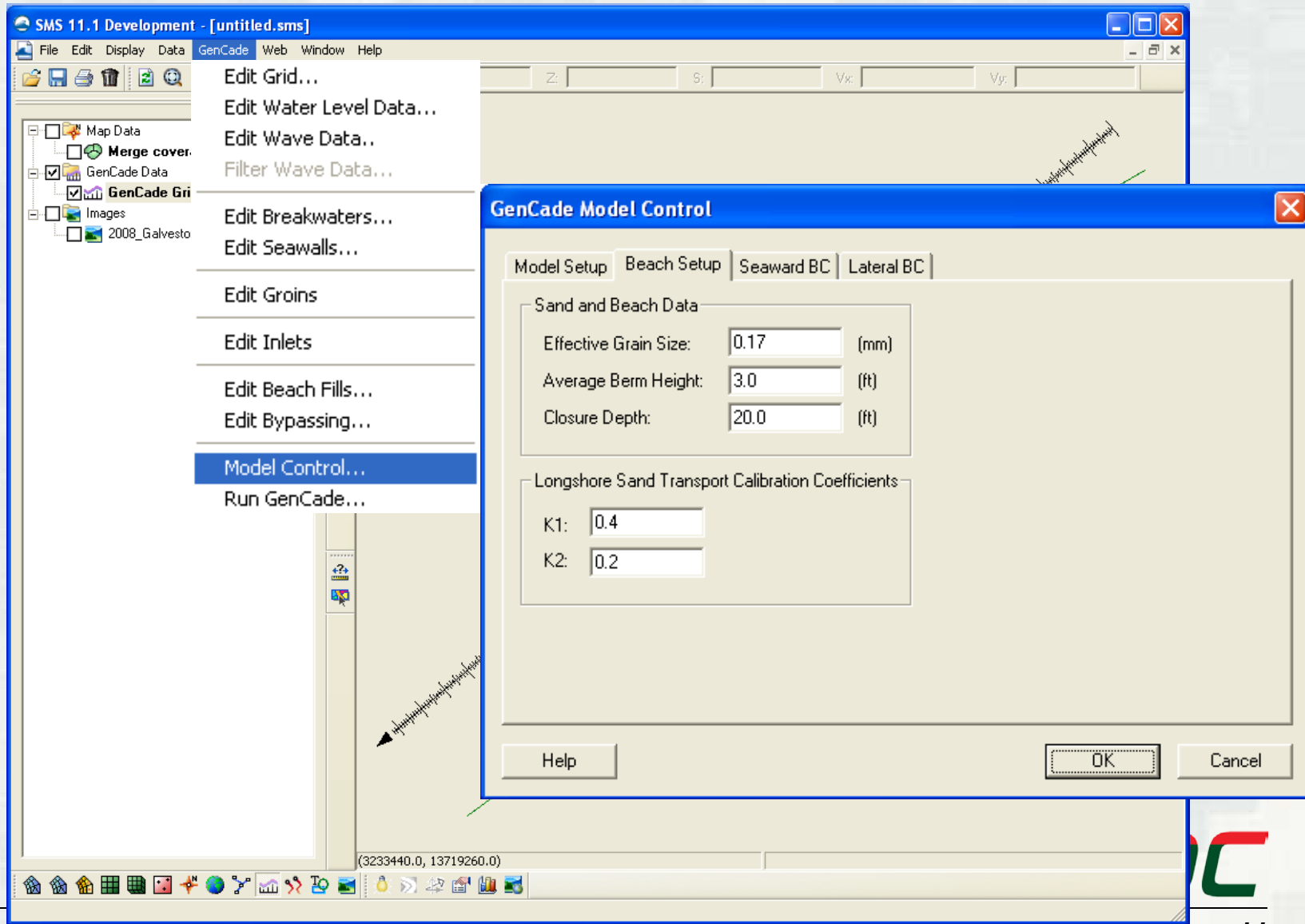


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# GenCade Model Control

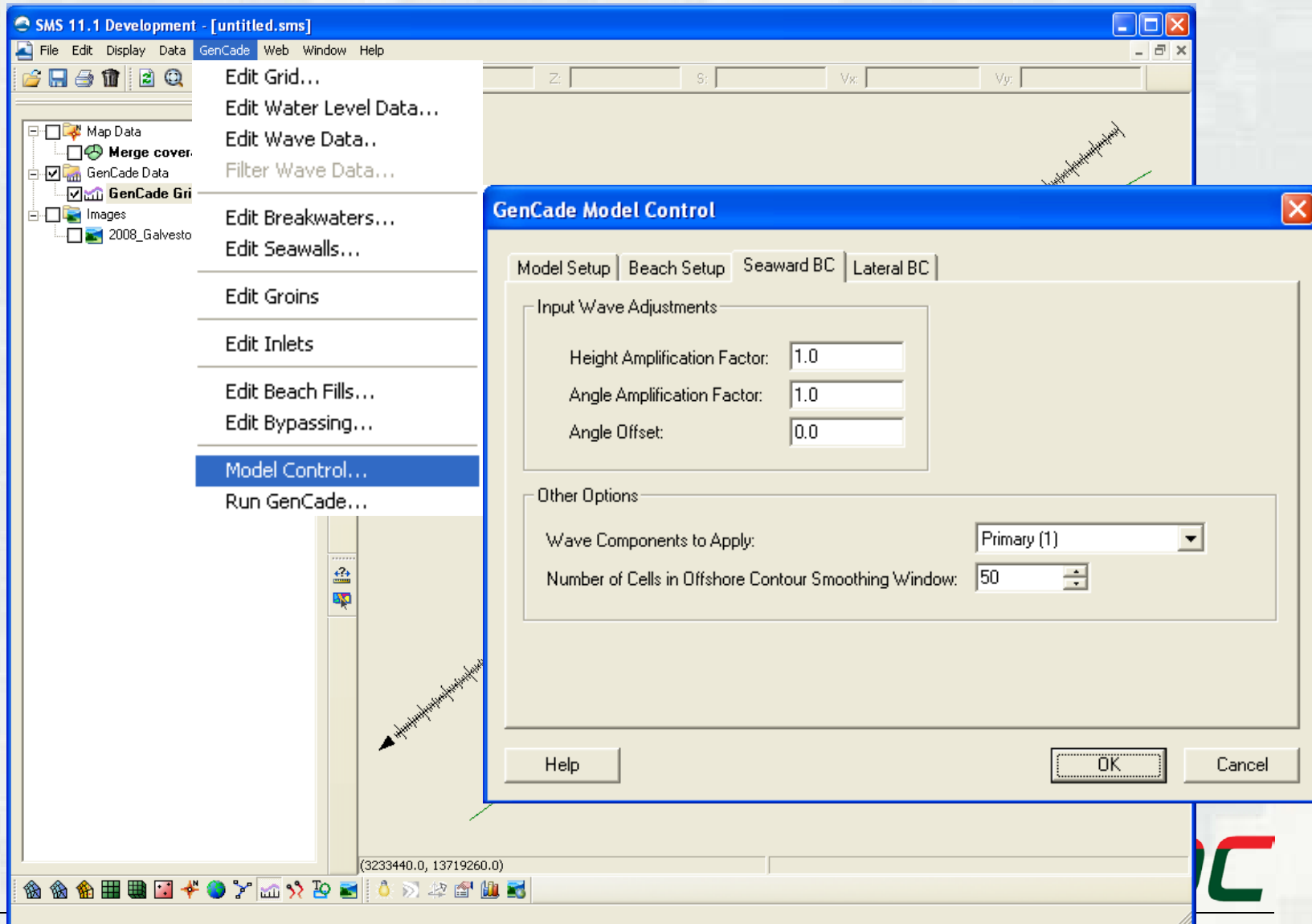


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# GenCade Model Control

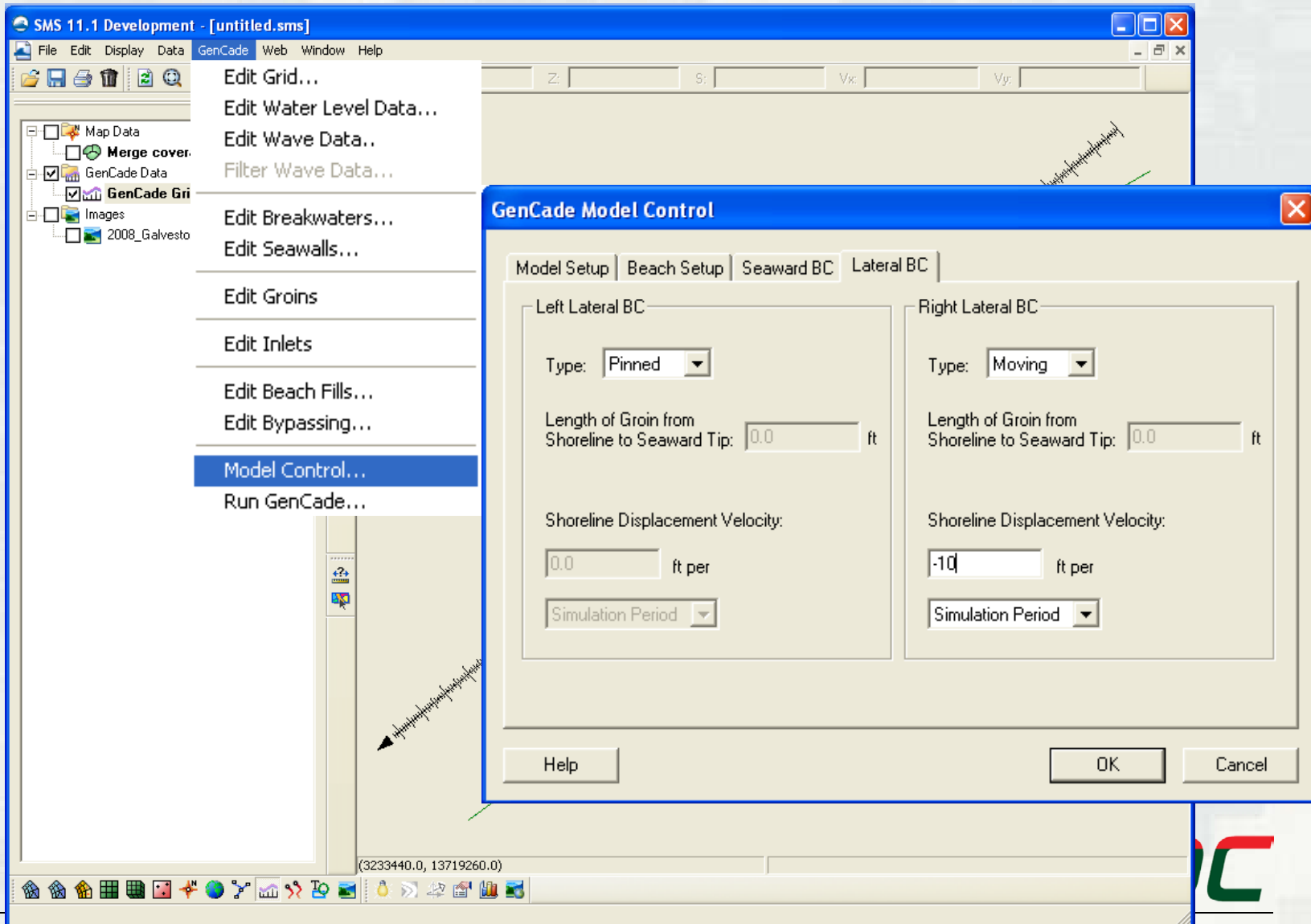


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# GenCade Model Control

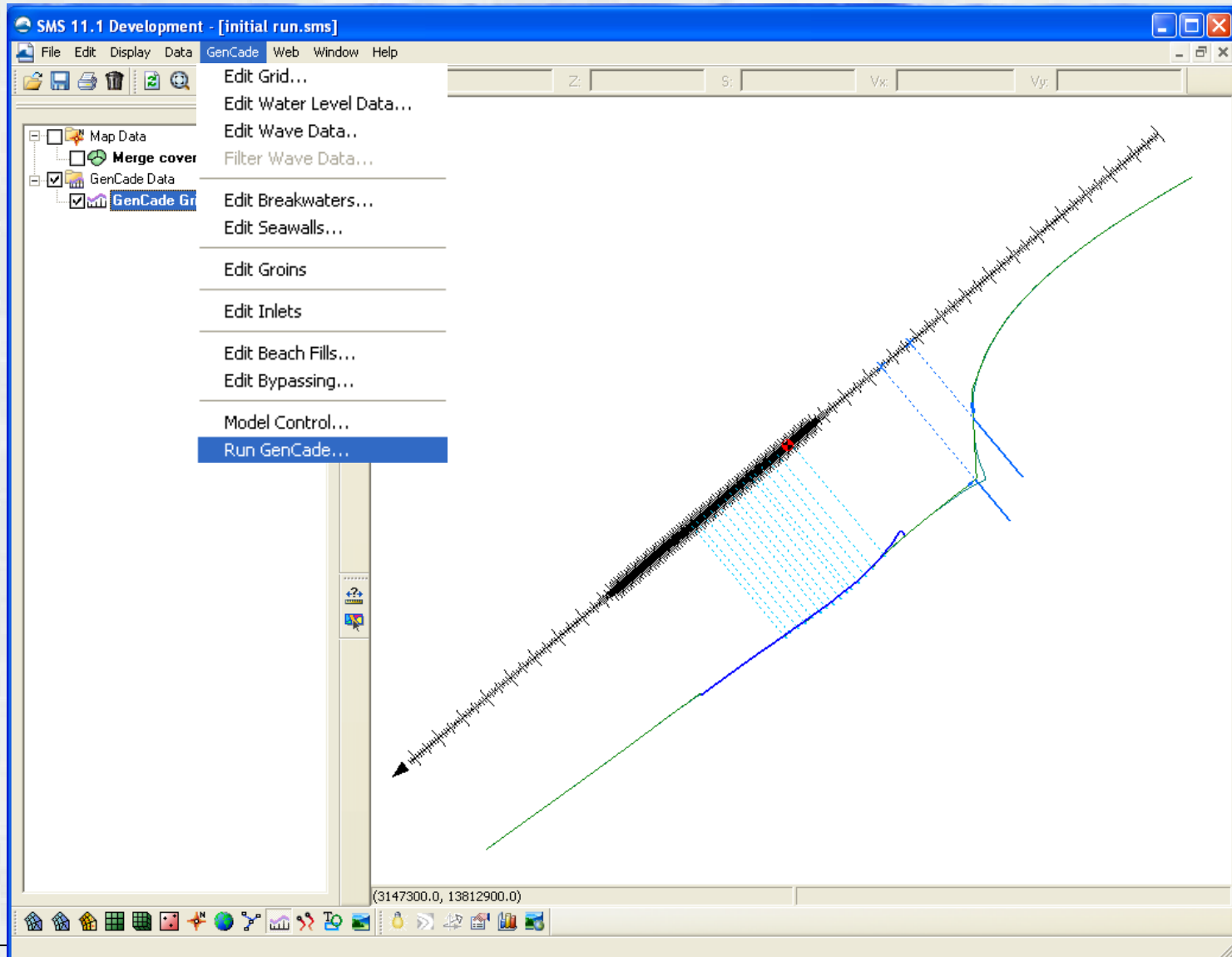


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# Run GenCade

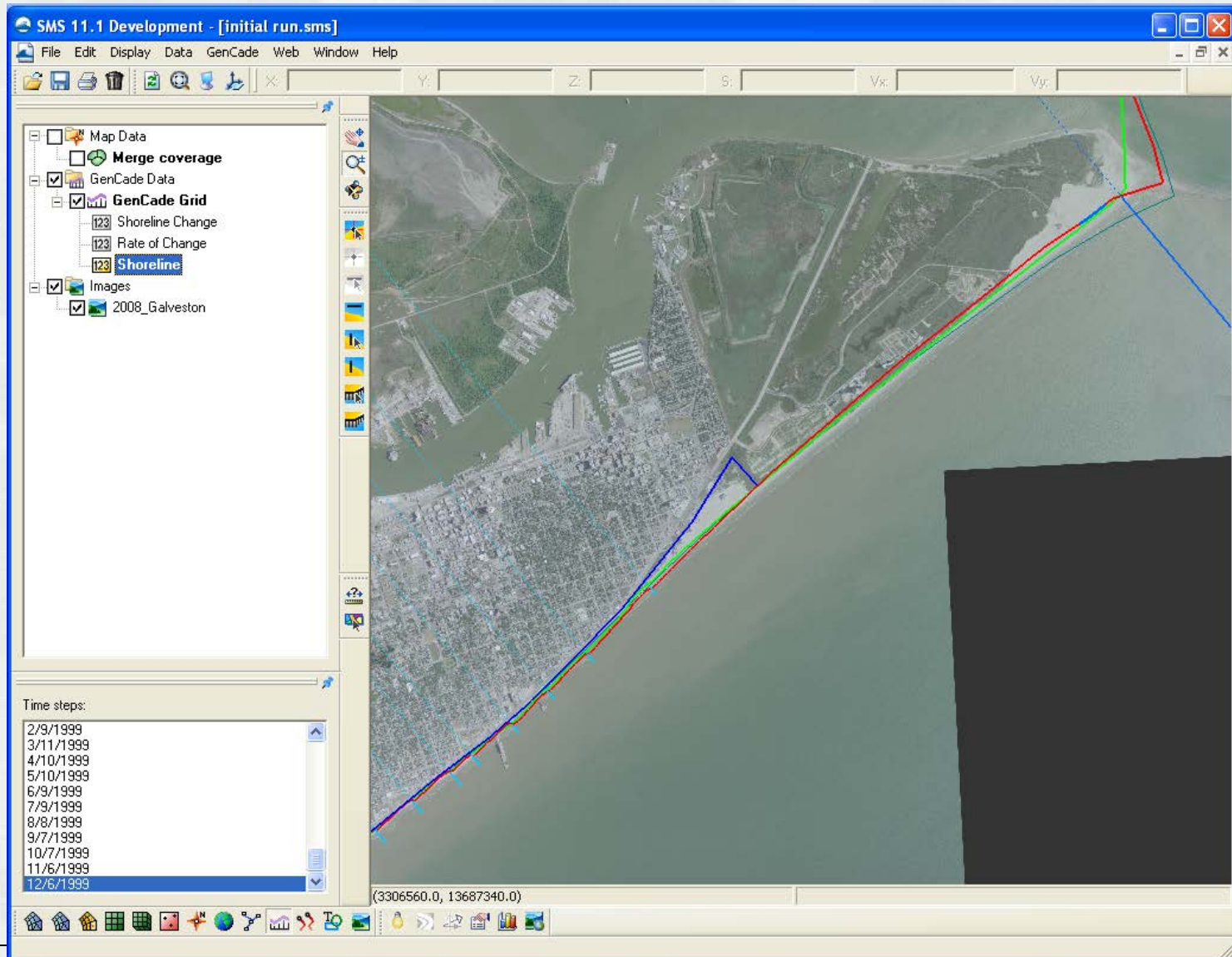


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# GenCade Results

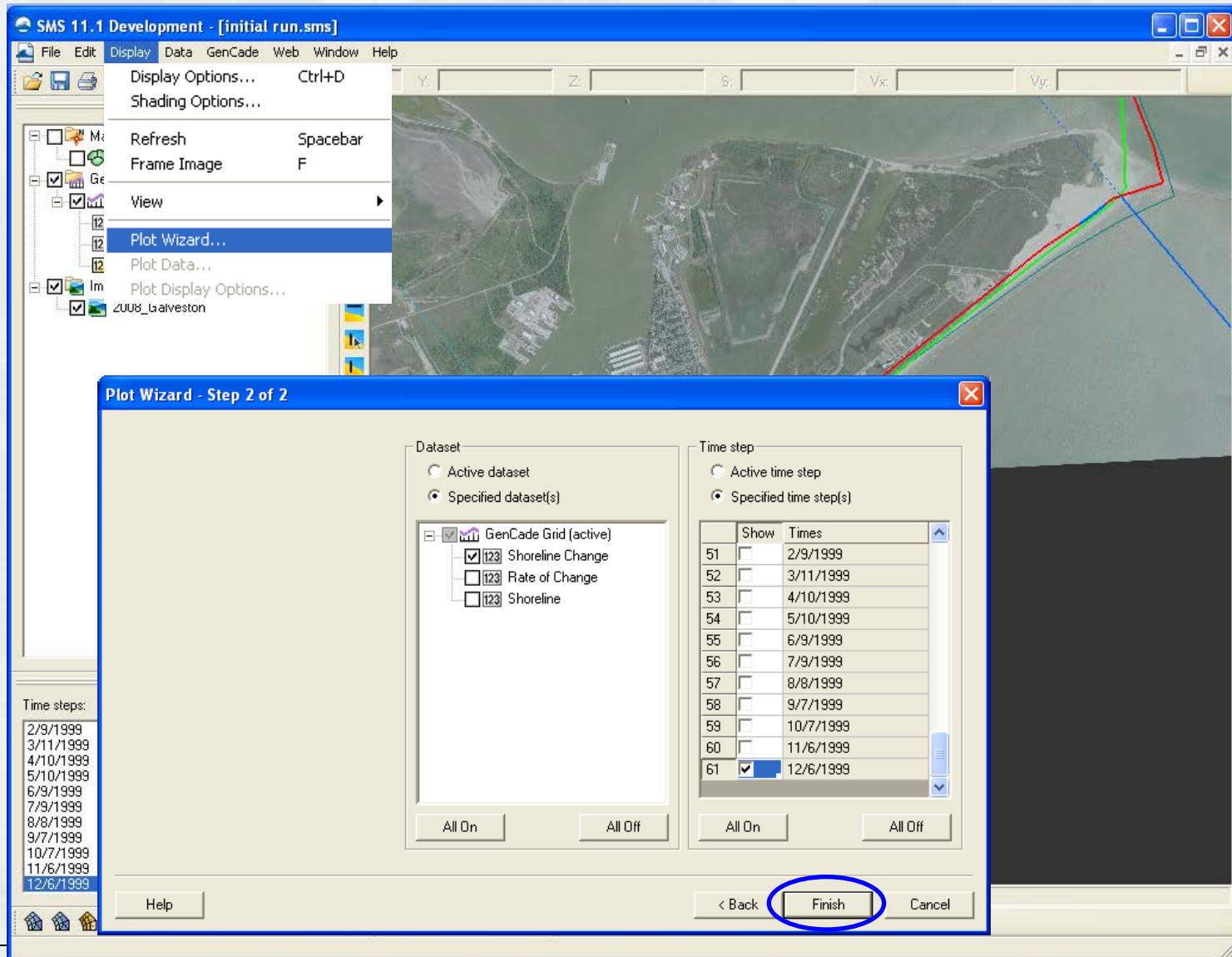


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# GenCade Results



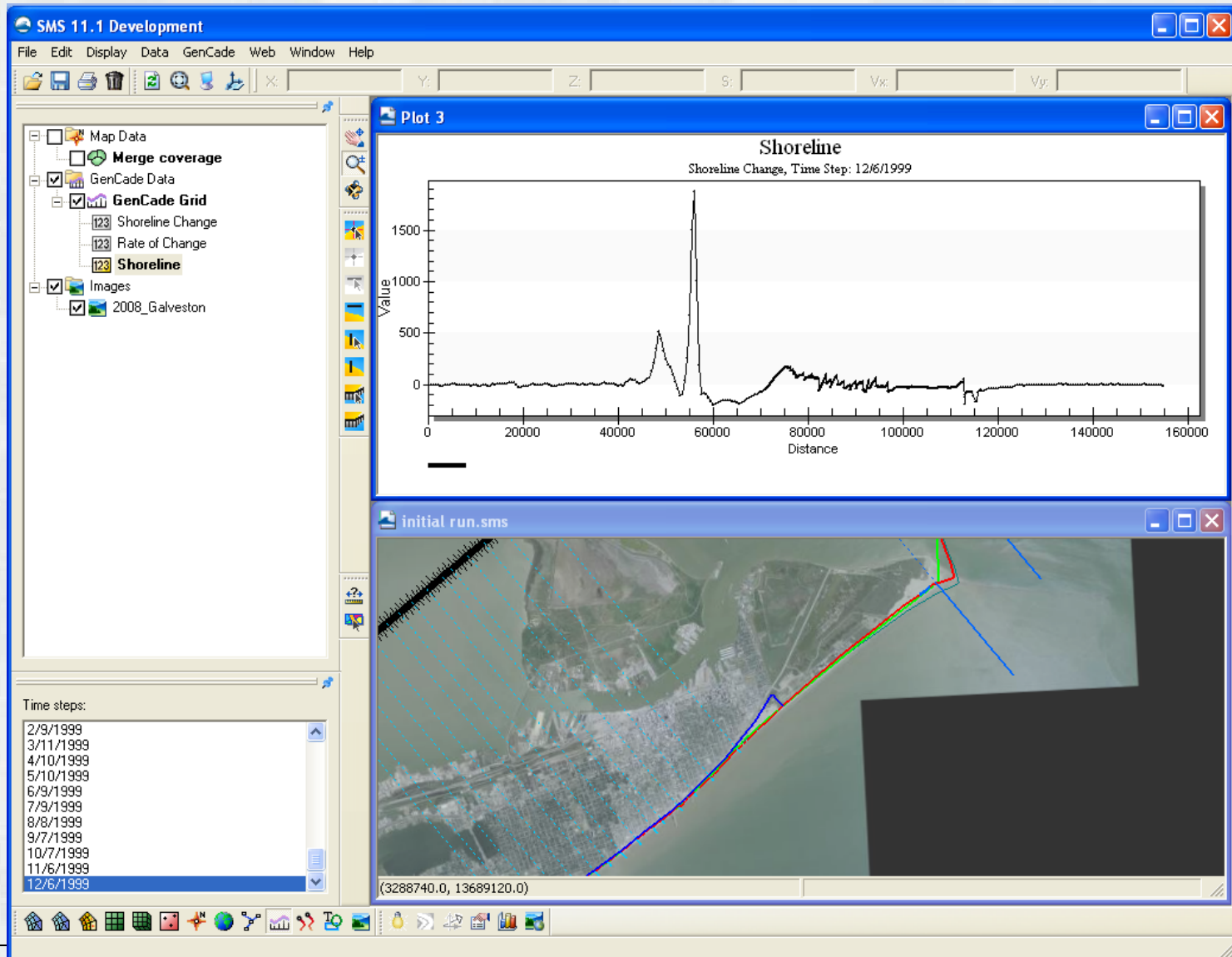
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# GenCade Results



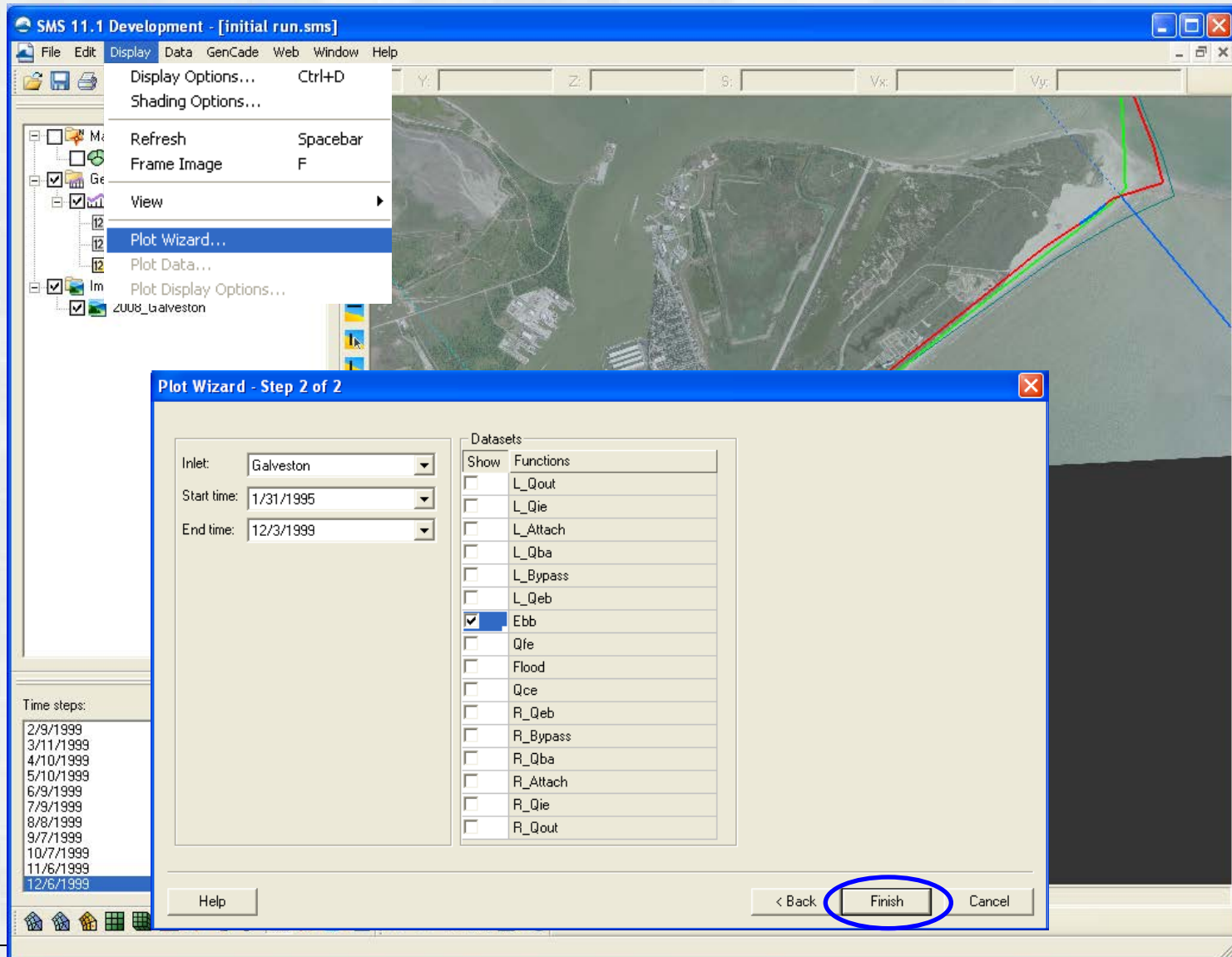
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# GenCade Results

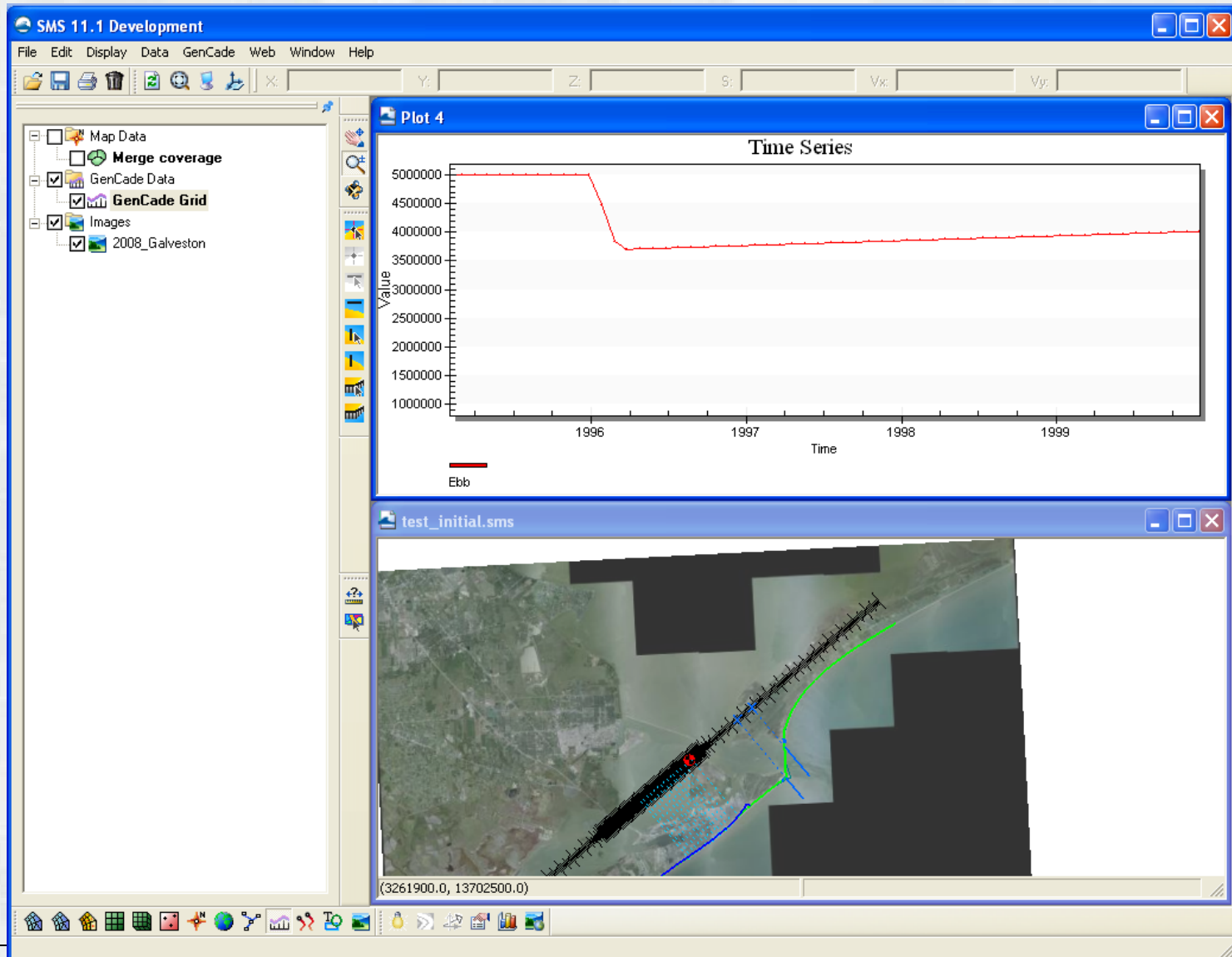


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# GenCade Results



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